UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,286	09/29/2000	Ganapati Srinivasa	42390P9663	1265

7590 08/01/2005	**EXAMINER**
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ART UNIT	PAPER NUMBER
2195	

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DATE MAILED: 08/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/675,286	SRINIVASA ET AL.
	Examiner	Art Unit	
	Syed J. Ali	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _12 May 2005_.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-6,8-17,19 and 20_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-6,8-17,19 and 20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau.(PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This office action is in response to the amendment filed May 12, 2005. Claims 1-6, 8-17,

and 19-20 are presented for examination.

2.   The text of those sections of Title 35, U.S. code not included in this office action can be

found in a prior office action.

Claim Rejections - 35 USC § 103

3.   **Claims 1-2, 4-6, 9-17, and 20 are rejected under 35 U.S.C. 103(a) as being**

unpatentable over Arai et al. (USPN 6,456,286) (hereinafter Arai) in view of Martin (USPN

6,684,255).

4.   As per claim 1, Arai teaches the invention as claimed, including a method comprising:

creating a scaled-down representation of application input data to a compute-intensive

application to determine costs to run the compute-intensive application (col. 5 lines 39-62; col. 7

lines 50-59; col. 9 lines 30-47); and

calculating a computing requirement based on the scaled-down representation (col. 7

lines 19-44; col. 8 lines 37-62).

5.   Martin teaches the invention as claimed, including:

calculating a turn-around time and an actual cost to a customer to run the compute-

intensive application with the application input data, on one or more processors, based on the

calculated computing requirement (col. 6 line 64 - col. 7 line 35); and

sending the turn-around time and the actual cost to a customer's client software (col. 9 line 61 - col. 10 line 2).

6.   It would have been obvious to one of ordinary skill in the art to combine Arai and Martin since the reduction in complexity of a graphics application serves a two-tiered benefit that is fully realized by the combination of Arai and Martin. Reducing the complexity of input data associated with a compute-intensive task is well known in the art, and is a goal that is achieved by both Arai and Martin. Arai's method of reducing the number of polygons in a calculation and Martin's giving preference to visible nodes that contribute to a scene reduce the amount of time required to render a scene without degrading quality. In addition, the accurate estimation of costs associated with smaller inputs allows more flexibility in terms of meeting budget constraints, as evidenced by Martin's heuristic cost calculator (col. 7 lines 44-52).

7.   As per claim 2, Arai teaches the invention as claimed, including the method of claim 1 wherein the compute-intensive application is to perform computer graphics rendering (Abstract, col. 5 lines 21-37).

8.   As per claim 4, Arai teaches the invention as claimed, including the method of claim 1 wherein the scaled-down representation of the application input data is generic to a class of applications (col. 11 lines 6-10).

9.   As per claim 5, Martin teaches the invention as claimed, including the method of claim 1 wherein the scaled-down representation of the application input data includes the geometry,

lights, number of triangles, textures, shading method, camera, ray-tracing, anti-aliasing, and

motion-blur of an underlying scene (col. 5 lines 3-19; col. 6 line 64 - col. 7 line 9). It is noted

that Martin does not specifically refer to the type of graphics calculations that are represented.

However, Martin addresses the need for specifying parameters of graphics calculations and lists

several types of calculations. The claimed operations associated with scene rendering are well

known and expected in the art. In graphics rendering, the claimed components are essential to

the realistic portrayal of a scene.

10.   As per claim 6, Martin teaches the invention as claimed, including the method of claim 1

wherein the turn-around time and actual cost are transmitted over an internet to the customer's

client software (col. 4 line 45 - col. 5 line 2).

11.   As per claim 9, Martin teaches the invention as claimed, including the method of claim 1

wherein the compute-intensive application is to perform computer graphics rendering and the

actual cost is provided to the customer in terms of cost per image frame (col. 6 line 64 - col. 7

line 35).

12.   As per claim 10, Arai teaches the invention as claimed, including a system comprising:

an application-specific module to scan one or more input data files to a compute-

intensive application and to collect statistical information to determine computing costs to run

the compute-intensive application (col. 5 lines 39-62; col. 7 lines 50-59; col. 9 lines 30-47); and

a heuristic modeler module coupled to the output of the application-specific module, to calculate a computing requirement (col. 7 lines 19-44; col. 8 lines 37-62).

13. Martin teaches the invention as claimed, including:

a run-time calculator module coupled to the output of the heuristic modeler module, to compute a turn-around time and an actual cost to run the application on one or more processors (col. 6 line 64 - col. 7 line 35).

14. As per claim 11, Martin teaches the invention as claimed, including the system of claim 10 wherein the modules are to communicate with each other over an internet (col. 4 line 45 - col. 5 line 2).

15. As per claim 12, Martin teaches the invention as claimed, including the system of claim 10 wherein the statistical information comprises a scaled-down representation of the input data files to include the geometry, lights, number of triangles, textures, shading method, camera, ray-tracing, anti-aliasing, and motion-blur of an underlying scene (col. 5 lines 3-19; col. 6 line 64 - col. 7 line 9).

16. As per claim 13, Arai teaches the invention as claimed, including an article of manufacture comprising:

a machine readable medium containing instructions which, when executed by a processor, cause a machine to perform operations comprising:

calculating a computing requirement based on a scaled-down representation of application input data to a compute-intensive application to determine costs to run the compute-intensive application, the representation having been created at a customer's machine (col. 5 lines 39-62; col. 7 lines 19-59; col. 8 lines 37-62; col. 9 lines 30-47).

17.   Martin teaches the invention as claimed, including:

calculating a turn-around time and an actual cost to the customer to run the compute-intensive application with the application input data, on one or more processors, based on the calculated computing requirement (col. 6 line 64 - col. 7 line 35); and

providing the turn-around time and the actual cost to the customer's client software (col. 9 line 61 - col. 10 line 2).

18.   As per claim 14, Arai teaches the invention as claimed, including the article of manufacture of claim 13 wherein the medium includes further instructions to create the scaled-down representation of the application input data as being generic to a class of applications (col. 11 line 6-10).

19.   As per claim 15, Martin teaches the invention as claimed, including the article of manufacture of claim 13 wherein the medium further includes instructions to create the scaled-down representation of the application input data as having the geometry, lights, number of triangles, textures, shading method, camera, ray-tracing, anti-aliasing, and motion-blur of an underlying scene (col. 5 lines 3-19; col. 6 line 64 - col. 7 line 9).y

20.   As per claim 16, Martin teaches the invention as claimed, including the article of
manufacture of claim 13 wherein the medium includes further instructions to enable the scaled-
down representation of the application input data to be received over an internet from the client
software (col. 4 line 45 - col. 5 line 2).

21.   As per claim 17, Martin teaches the invention as claimed, including the article of
manufacture of claim 13 wherein the medium includes further instructions to enable the turn-
around time and actual cost to be transmitted over the internet to the customer's client software
(col. 9 line 61 - col. 10 line 2).

22.   As per claim 20, Martin teaches the invention as claimed, including the article of
manufacture of claim 13 wherein the medium includes further instructions to calculate the actual
cost in terms of cost per image frame (col. 6 line 64 - col. 7 line 35).

23.   **Claims 3, 8, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over
Arai in view of Martin in view of Agarwal (USPN 5,854,752).**

24.   As per claim 3, Agarwal teaches the invention as claimed, including the method of claim
1 wherein the compute-intensive application is to perform logic simulation (col. 5 line 48 - col. 6
line 22).

25.   It would have been obvious to one of ordinary skill in the art to combine Arai and Martin
with Agarwal since determining the cost of an application is most easily done by determining the

breadth of an application. In the case of a logic simulation, the complexity is most closely related to the number of logic gates, i.e., the greater the number of logic gates associated with a function, the greater the complexity and thus, the higher the associated cost should be. Any type of application that is farmed out and requires cost estimation serves to benefit from an accurate method of predicting the price. Logic simulation is an application that requires a great deal of compute resources and stands to benefit from a reduced complexity calculation.

26.   As per claim 8, Agarwal teaches the invention as claimed, including the method of claim 1 wherein the compute-intensive application is to perform logic simulation and the actual cost is provided to the customer in terms of cost per logic gate (col. 5 line 48 - col. 6 line 22).

27.   As per claim 19, Agarwal teaches the invention as claimed, including the article of manufacture of claim 13 wherein the medium includes further instructions to calculate the actual cost in terms of cost per logic gate (col. 5 line 48 - col. 6 line 22).

Response to Arguments

28.   **Applicant's arguments filed May 12, 2005 have been fully considered but they are not persuasive.**

29.   With respect to Arai, Applicants argue, *"Arai does not teach or suggest at least the following element of 'creating a scaled-down representation of application input data to a compute-intensive application to determine costs to run the compute-intensive application,' as*

the Examiner has indicated. Instead, Arai teaches reducing the number of polygons for a three-dimensional character while maintaining the quality at a certain level." Applicants also argue, *"Arai also does not teach or suggest determining cost. Instead, Arai teaches saving rendering costs by changing the number of polygons."*

30. Regarding the former portion of the argument, it is well known that three-dimensional graphics processing is an application that is computationally expensive, as numerous efforts have been made at optimizing graphics processing. The invention of Aria, by reducing the number of polygons required to render a three-dimensional environment while maintaining a standard of quality, allows an image to be rendered faster and cheaper. There is no doubt that Arai "creates a scaled-down representation of application input data to a compute-intensive application."

However, Applicants also argue that Arai fails to teach that the scaled-down representation is for determining costs to run the application, while noting that Arai does seek to save rendering costs. It should be pointed out that Arai is not cited as calculating the cost to run the compute-intensive application. The portion of the limitation pertaining to this feature is included as an intended use statement. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963). The feature of calculating the actual cost to run the application is included in a separate limitation, and Martin is cited as teaching this feature (see paragraph 5).

31.   Applicants argue, *"Martin does not teach or suggest at least the following element of*

'sending the turn-around time and the actual cost to a customer's client software,' as suggested

by the Examiner. Instead, Martin teaches selecting the representations to be delivered to the

client based on a cost budget."

32.   Examiner respectfully disagrees with Applicants' characterization of Martin. Martin

describes a client-server framework for a client to submit a request for an image to rendered and

the server to respond adaptively to the request. The adaptive response considers factors

including the turn-around time, the frame rate, the quality of the rendering, and the cost

associated with the representation. The server is designed to adaptively respond to the client, not

to make its own decisions regarding the rendering process. The client and server communicate

via a typical network connection, where the server communicates parameters to the client, who

may alter the request depending upon the information received. For instance, if the turn-around

time or the cost is too high, the client may request a lower quality model to reduce those

parameters. This teaching directly corresponds to Applicants' claimed feature of "sending the

turn-around time and the actual cost to a customer's client software."

Conclusion

33.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Syed J Ali whose telephone number is (571) 272-3769. The

examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai T An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
July 26, 2005

MAJID BANANKHAH
PRIMARY EXAMINER